

Procedure for the management and prevention of risks for process in budgeted universities

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Abstract

The current international context demand the application of modern focuses of management that is why the internal control, to the being a process integrated to the operations with a focus of continuous improvement, becomes a priority in the organizations. Front this challenge the Universities has intended the improvement of the component of management and prevention of risks. The investigation has as objective to develop a procedure for the management and prevention of risks for processes in universities and as main results of its application it is obtained, from the strategic perspective a group of lines of action of improvement to continue for the improvement of the capacity of strategic prevention and from the operative one the inventory of risk, its classification, qualitative evaluation, the map of risks, with the definition of the priorities and the plan of prevention. In the study theoretical methods were used as: analysis and synthesis of the information obtained starting from the literature revision and specialized documentation, list of checkup, as well as of the experience of specialists and consulted workers, empiric methods as interviews, direct observation, consultation of documents for the summary of the information, among others that contributed to the execution of the outlined objective, and statistical methods how the descriptive statistic and the coefficient Alpha of Cronbach to measure the reliability of the applied instrument.

Keywords: internal control, risk management and prevention and process management.

1. Process management in internal control in the Cuban context

Management as a discipline arises from the very development of society and the transformations that have occurred in the business sector, due to the increase in competition and the constant changes in the environment. That is why it has gradually evolved and enriched with innovative tools, extending its radius of action beyond the business sector, currently recognized by various authors at the national and international level to universities as an object of management (Ortiz Pérez, 2014). Cuban universities are involved in constant transformations to increase the efficiency and effectiveness of their management. In the Guidelines of the Economic and Social Policy of the Party and the Revolution, emanating from the VI Congress of the Communist Party of Cuba, are the bases for the improvement of Cuban higher education, which advocate continuing advancing in the elevation of the quality in the higher education. In correspondence with the guidelines, since the national preparation seminar for the 2011-2012 academic year of the Ministry of Higher Education (MHE),

four higher education management was established in the key result area (KRA) as an objective: to increase quality, efficiency and rationality of the management in the entities, with greater integration of the processes and in accordance with the approved plans and budget; To this end, each university must have designed its management system oriented towards quality and the integration of processes. In this context, internal control is fundamental in universities to increase their efficiency and effectiveness. The MHE incorporates internal control to its functions in the 2001-2002 academic year, and the 2014-2015 course in KRA 4 includes the objective of increasing the quality of prevention work based on the reduction of indiscipline, crime and manifestations of corruption, based on the systematic identification of the risks and vulnerabilities present in the organization. In 2011, the Comptroller General of the Republic of Cuba (CGR) issues Resolution No. 60 of internal control, which had as precedents the resolutions No. 13 of 2006 issued by the Minister of Audit and Control referred to the objective of preventing , through the management of risks and No. 297 of 2003 issued by the Minister of Finance and Prices, which had in the component "Risk assessment", the procedure for quantifying and assessing the impacts caused by these, focused on reducing costs due to accidents or product losses. The new resolution of the Internal Control System (ICS) establishes 19 standards grouped into five components: Control Environment, Management and Risk Prevention, Control, Information and Communication Activities and Supervision and Monitoring. It conceives the ICS with a continuous improvement approach, extended to all the activities inherent to the management, carried out by the management and the rest of the personnel; it is implemented through an integrated system of rules and procedures, which contribute to anticipate and limit internal and external risks, providing reasonable assurance of the achievement of institutional objectives. The universities are benefited with the new resolution, because it has an open design that allows organizations to profile the ICS depending on their characteristics. The Risk Management and Prevention component is of great importance in Cuban universities, with respect to this Ricard (2006) refers to the importance of risk assessment in universities, being units budgeted by the Cuban State, large and complex, taking into account the different academic and investigative activities that they develop and the magnitude in absolute figures of the budget that is granted to them. After evidenced the need to manage the risks in the universities is defined as the objective: Develop a procedure for the management and prevention of risks by processes in universities.

1. 1 Procedure for the management and prevention of risks for process in universities

For the proposal of the procedure, an extensive bibliographical consultation was made in which the lack of a procedure that integrates the management by processes with the management and prevention of risks in universities was evidenced. Of the procedures studied, the ones proposed by Ortiz Pérez (2014) and Bolaño Rodríguez (2014) were taken as a reference. The objective of the procedure is to contribute to the improvement of risk management and prevention in universities by integrating the tools of process management, with management and risk prevention to achieve the objectives. The proposed procedure is divided into four stages, which are shown in Figure 1, for the development of the communication and training stages and stage one of preparing the conditions for the study was taken as reference the proposal made by Ortiz Pérez (2014).

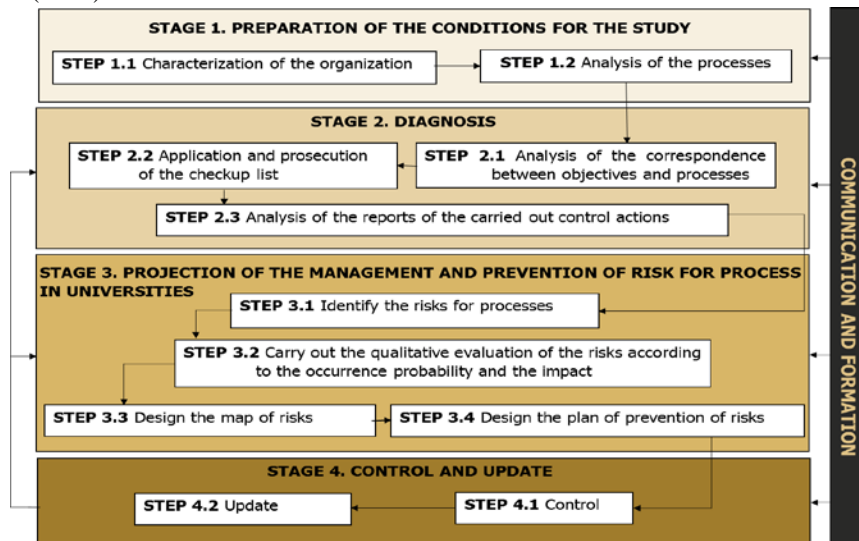


Figure 1. Procedure for the management and prevention of risks in universities

Stage Communication and training

Communication and training is a cross-cutting stage that is maintained throughout the procedure, constitutes a permanent feedback channel that is fundamental at the decision levels, to achieve the commitment and participation of workers, in order to achieve the objectives planned during the application of the procedure.

A work schedule should be designed in which the training activities to be developed are specified at each stage of the procedure, as well as the person responsible for its execution.

Stage 1. Preparation of the conditions for the study

In this stage the conditions are created for the analysis of risk management and prevention, with the characterization of the university and the design of its processes if necessary.

Step 1.1 Characterization of the organization

One of the vital elements to develop before initiating a research project is to characterize the organization object of study, since it allows the familiarization with the particularities of the same and allows a greater approach to its organizational culture. Some of the elements that can be considered for the characterization are a brief historical overview, organizational structure and management levels, the composition of the workforce must be analyzed in teaching and non-teaching workers and the faculty by faculty category, academic degree and scientific degree.

Step 1.2 Design or analysis of processes

In case the organization is designed by processes, an analysis of them is carried out, but the general map of processes and the documentation of them are done through the tasks shown in the specific procedure of Figure 2

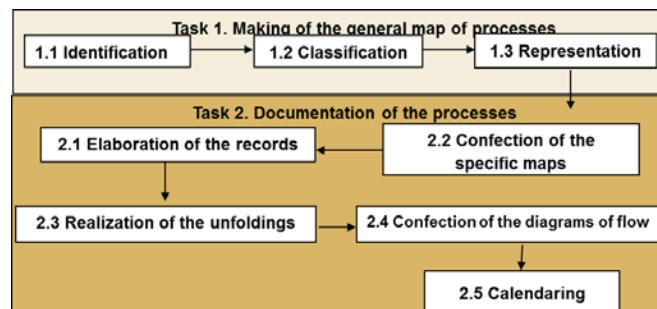


Figure 2. Specific procedure for the design of the processes.

Source: Ortiz Pérez (2014)

Task 1.2.1 Preparation of the process map

Process maps are for organizations one of the most used tools, being the most representative way to reflect all processes and their interrelations. In this task the general map of processes of the university will be drawn up, since it is of vital importance for the understanding of the same as a system, for it the following actions must be carried out:

Action 1.2.1.1 Process identification

The identification of the university processes begins with a brainstorming session with the experts, who can be managers and professors of experience in the university.

Action 1.2.1.2 Classification of processes

Through consensus search techniques, such as brainstorming and the Kendall concordance coefficient method, the processes are classified into strategic, substantive, support and cross-sectional processes, for which the following questions should be asked: To identify the substantive processes: What are the key processes in the universities to be those that add value and allow the fulfillment of its mission?

To identify the support processes: What resources do the substantive processes need for their execution? Support processes are suppliers of substantive processes (internal clients).

To identify the strategic processes: What are the processes that must be managed with a strategic focus because they guarantee the development of the university over time and the achievement of its vision?

Action 1.2.1.3. Representation of the process map

Figure 3 shows the structure of a process map, the inputs will be related to the demands of society and the outputs with the satisfaction of them, which are associated with the substantive processes to be these where the chain is generated of value. The direction of the arrows that are used in their design will indicate the relationships that are established.

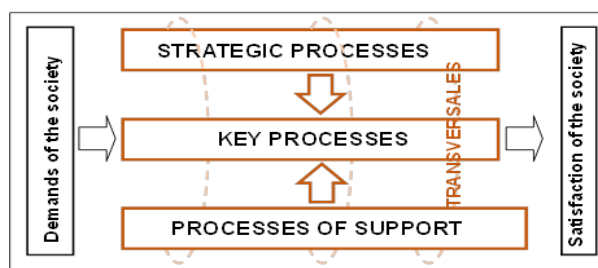


Figure 3. Representation of the structure of a process map

Source: Ortiz Pérez (2014)

For the development of this action, the procedures proposed by Nogueira Rivera (2002), Hernández Nariño (2010) and Comas Rodríguez (2013) can also be used.

Task 1.2.2 Process documentation

For the development of this task should begin with the review and analysis of all legal documentation, regulations and current techniques, as well as conducting interviews with managers and experience professors of the university in order to know the particularities of the processes and make their description. It is recommended to start with the substantive processes and then continue with the support, strategic and cross-cutting processes. The specific maps of each process are made, the cards, displays and flowcharts are elaborated.

Action 1.2.2.1 Make the specific map of the process

The objective of the specific maps is to show the interrelations that are established between the sub-processes of the process that is analyzed, for them the following steps are carried out:

1. The inputs and outputs of the process are identified.
2. Sub-processes are identified.
3. The relationships between the sub-processes and their address are established.
4. The process is represented.

Action 1.2.2.2 Elaborate the process sheets

The process cards are designed in the organization according to their needs, so the elements identified for their conformation were defined in correspondence with the particularities of the university, as shown in Table 1. In addition to the general files of each process the sub-processes files are elaborated for a better organization and understanding of it.

Table 1 Process tab model. Source: Ortiz Pérez (2014)

Logo and identifier of the university		Name of process	
Responsible:		Goals:	
Subprocesses:			
Legal, regulatory and technical documents:			
Income:		Outcome:	
Suppliers:		Customers:	
Process description:			
Generated records:			
Process risks:			
Relations with other processes:			
Indicators:			
Produced by:	Date:	Reviewed by:	Date:

Action 1.2.2.3 To Carry out the unfolding of the processes

In this step it is carried out the unfolding of the processes of the university, it is considered that it is fundamental for the directive, to the being a detailed description of the processes of the organization. In the Table 2 are shown a model of process unfolding and the elements that contain it.

Table 2 Process deployment model. Source: Ortiz Pérez (2014)

Name of process			
Subprocesses	Activities	Chores	Actions
Segments that make up a process, its identification can be useful for a better understanding of these.	Set of interrelated tasks oriented to obtain a specific result.	Unordered steps that make up the activities.	They will be included when required to detail each task.

Action 1.2.2.4 Elaborate the flowcharts of the processes

The flowchart of processes is a tool widely used in organizations, defined as a schematic photograph of this, for its preparation the following steps are performed:

1. Establish the sequence of activities that make up the process.
2. Define the entries for each activity and the records that are generated.
3. Link each activity with the person responsible for its execution.
4. Graphically represent the flow chart, through the use of established symbols.

Action 1.2.2.5 Schedule

The scheduling of processes is a fundamental tool for the organization of the work of managers, since it shows all the information flow that is generated, the model for carrying out the scheduling is shown in Table 3, and the steps for its design are the following:

1. The information generated in the development of each process is listed.
2. The information is ordered in the period of time in which it is issued.
3. The level it delivers and the level it receives are assigned.

Table 3 Information scheduling model.

Name of process								
Number	Information to be delivered	Month in which the information is delivered					Level that informs	Level that receive
		J	F	...	N	D		
1								
2								

3									
n									

Source: Ortiz Pérez (2014)

Stage 2. Diagnosis

In this stage, a diagnosis is made of the current situation presented by the university with respect to the management and prevention of risks, from a strategic perspective and another operational one. The strategic part consists of the analysis of the degree of correspondence between the objectives of strategic planning and the processes, as well as the determination of strategic prevention capacity through the application of the checklist proposed by Bolaño Rodríguez (2014) in the Strategic Management model based on risk management for the integration of the company's management system (DE - ARISDE). Then an analysis is made from the operational perspective through the review of the reports of visits, audits and inspections made to the university during the year.

Step 2.1 Analysis of the correspondence between objectives and processes

For the successful achievement of the objectives proposed in the strategic planning of the university there must be correspondence between these objectives and the processes that are developed.

In Cuban universities prevails, the tendency to strategic planning, or the so-called, direction by objectives with strategic focus. The objectives constitute one of the fundamental categories of management activity, because they condition the actions of the organization and, in particular, of its directors. In Cuban universities the objectives are defined by the MHE, although they can be modified, likewise each university, if it considers it pertinent, formulates other objectives and then derives at the level of faculties and departments (Ortiz Pérez, 2014).

In this step, the correspondence between the different key results areas, their objectives and measurement criteria with the identified processes is analyzed. To perform this analysis, the matrix of relationships shown in Table 4 is used as a tool. This analysis responds to the premise that if the risks are identified by processes and there are processes that do not have an expression in any of the objectives there is a danger that they will get out of control.

Table 4. Relationship matrix objectives-processes

Processes \ Goals	1	2	...	n
1				
2				
...				
n				

Step 2.3 Application and processing of the checklist

In this step we continue with the analysis of the strategic perspective of risk management and prevention in the university through the application of the checklist of the DE-ARISDE model, adapted from Bolaño Rodríguez (2014). The step is divided into two tasks, application and statistical evaluation of the results.

Task 2.3.1 Application of the checklist

The checklist contains 34 questions grouped into 11 variables to assess the current status of the organization with respect to strategic management with a risk prevention approach, the strategic prevention capacity (EPCA). This checklist is a diagnostic tool to evaluate organizations with respect to the DE-ARISDE model. In Figure 4 the structure of the checklist is shown.

Variables	Dimension	Outcome
Qualified management team Prepared workers Strategic direction	Design of the strategic orientation and the preparation of the university for the management of risks	E P C A
Preparation of the organization for the management of risks		
Diagnosis of risks for processes	Management of risks in an integrated way	
Integrated analysis of risks Risks's Strategies		
Strategic programs of actions		
Information and communication Implementation of the strategic actions	Implementation and control	
Revision evaluation and control		

It applies to a group of experts, with knowledge and experience about the direction and management of the organization. For better effectiveness, the following steps are carried out:

- training of the group of experts regarding the checklist of the DE-ARISDE model,
- review of the documentation related to the process of strategic management and risk management in the organization,
- presentation of the results of the review of the documentation in the meeting of the group of experts,
- members of the board of directors that do not belong to the selected group of experts can also participate in this meeting;
- application of the checklist to the group of experts (at least 9 experts).

Task 2.3.2 Statistical evaluation of the results of the application of the checklist

An assessment of the results of the application of the checklist is made. To carry out this activity at the university, the following steps are carried out:

- analyze the reliability of the instrument through the Cronbach's Alpha and verify that it is greater than 0.7,
- obtaining a reliability lower than 0.7 can be given by the non-compliance of the conditions explained, in the previous task,
- analyze the results with the use of descriptive statistics, such as: the mean, geometric mean, median, mode, maximum value, minimum value, among others.

Step 2.3 Analysis of the reports of the control actions carried out

A relevant source of information on the state of risk management in the university is the reports of the visits, audits and other control actions that are carried out, whether internal or external. The results of the application of the general self-control guide are analyzed and reflected in the plan of measures that is elaborated from this to be delivered to the MHE.

An immediate update of the prevention plan can be derived from the results of the control actions. In this step the deficiencies reflected in the reports are analyzed since these are possible vulnerable points that can affect the functioning of the university.

Stage 3. Projection of risk management and prevention in the university

In this stage, the steps proposed by Ortiz Pérez (2014) are followed for the preparation of the risk prevention plan.

Step 3.1 Identify risks by processes

The inventory of the existing risks in the different areas of the university is carried out. The vice-rectors, general managers, deans and heads of area must identify the risks that may affect the achievement of the objectives and goals of the organization in the processes they lead, whether substantive, strategic, support or cross-cutting.

Step 3.2 Carry out the qualitative evaluation of the risks according to the probability of occurrence

To carry out the qualitative evaluation of the risks, the frequency (infrequent, frequent and moderate) and the impact (catastrophic, serious, moderate and mild) must be considered.

Step 3.3 Design the risk map

The impact is represented in the axis of the Y, in the X axis the frequency and priorities are established, considering that:

- those risks whose impact is catastrophic or serious have a high priority,
- medium priority those whose impact is moderate,
- lowers those that have a slight impact, and
- Within these categories, those risks whose probability of occurrence is frequent take precedence.

Step 3.4 Design the risk prevention plan

According to Resolution 60/11 of the CGR, the risk prevention plan constitutes an instrument of management work to systematically monitor the determined control objectives, it is updated and analyzed periodically with the active participation of workers and in the presence of facts that require it. It must be elaborated according to what is established in the model of annex two, it is structured by areas or activity and that of the entity, the author recommends that it be designed by processes. For its preparation the risks are identified, possible negative manifestations; measures to apply; responsible; performer and date of compliance with the measures.

Stage 4. Control and update

In this stage the control actions that are carried out in the university are described and their results can bring with them the update of the prevention plan.

Step 4.1 Control

For there to be a control environment the approved organizational structure must be functional, adaptable, respond to the needs, guaranteeing an adequate separation of operation, administration, management and custody functions. The areas of responsibility must be well defined and the lines of authority and responsibility required in the organic regulation, there must be documented manuals and procedures, professional competence, personnel management policies and the control committee must operate with stability.

As part of the control, systematic self-evaluations are carried out in each work area to identify the deficiencies and propose improvement actions, which will serve as preparation for external controls.

In universities, control has different ways of manifesting itself:

- the actions derived from the control activities of the processes,
- the general self-control guide as part of the internal control,
- the audits developed by the group of internal auditors, and
- the control actions of external entities.

Step 4.2 Update

The updating of the risk prevention plan of the university is fundamental to ensure the correct functioning of the processes that are developed in it and the achievement of the proposed objectives. The prevention plan is subject to updating in two situations:

- in the corresponding year period as planned, and
- in the event that an event occurs that warrants it, as a result of some deficiency detected during the control actions referred to in the previous step.

References

- Aguilera GKRAíA, L. (2006). The university of the 21st century. An epistemology of higher education before the knowledge society. Mexico: UNESCO Publishing.
- Álvarez Domínguez, R. (2011). Design of the Management Control System of the Faculty of Industrial Engineering of the University of Holguín Oscar Lucero Moya. (Thesis presented in option to the title of Industrial Engineer), Holguín University Oscar Lucero Moya, Holguín, Cuba.
- Baquero Guilarte, R. (2012). Contribution to the Internal Control System through the design and application of a procedure for the audit of the Occupational Health and Safety Management System, in Holguín Hydraulic Utilization Company. (Thesis presented in option to the title of Industrial Engineer), Holguín University Oscar Lucero Moya, Holguín, Cuba.
- Bolaño Rodríguez, Y., Alfonso Robaina, D., Ramírez MoroII, A. and Hernández Rodríguez, A. A. (2011). Identification model, measurement, risk assessment for strategic management. *Industrial engineer*. XXXII (2): p. 162-169.
- Castro Ruz, R. (2011). Central Report to the VI Congress of the Communist Party of Cuba. [cited; Available from: www.juventudrebelde.cu].
- Comas Rodríguez, R. (2013). Integration of management control tools for strategic alignment in the Cuban business system. Application in companies of Sancti Spiritus. (Thesis presented as an option to the scientific degree of Doctor of Technical Sciences). University of Matanzas Camilo Cienfuegos, Matanzas, Cuba.
- Office of the Comptroller General of the Republic. (2011). Resolution No.60 Rules of the Internal Control System. Official Gazette of the Republic.
- Dorta Velázquez, J.A. (2008). Risk assessment as a basic component of the internal control system, Málaga: Eumed.net.
- Góngora Peña, E. (2013). Update of the Management Control System of the University of Holguín. (Thesis presented in option to the title of Industrial Engineer), Holguín University Oscar Lucero Moya, Holguín, Cuba.
- González Méndez, L. (2005). The internal control and the integral control panel, a powerful intangible combination. City of Havana: University Press Félix Varela.
- Marín Guerrero, M. A. (2002). New concepts of internal control. COSO report. 30p. Mexico.
- Ministry of Higher Education. (2011). Seminar to prepare the 2011-2012 academic year of the Ministry of Higher Education. Havana: University Press Félix Varela.
- Ministry of Higher Education. (2012). Information from the Ministry of Higher Education to the People's Power Assembly. Havana: University Press Félix Varela.
- Ministry of Higher Education. (2012). Work objectives for the year 2013 and until 2016. Havana: University Press Félix Varela.
- Ministry of Higher Education. (2012) Procedure for the planning and control of the objectives and the plan of activities. Havana: University Press Félix Varela.
- Ministry of Higher Education. (2013). Instruction No. 4 on the MHE planning system. Havana: University Press Félix Varela.
- Ministry of Higher Education. (2013). Work objectives of the organization for the year 2014. Havana: University Press Félix Varela.
- Nieves Julbe, A.F. (2010). Procedure to implement the Control Environment through key processes of the Integrated Human Capital Management System. (Thesis presented in option to the scientific degree of Doctor of Technical Sciences) University of Holguín Oscar Lucero Moya, Holguín, Cuba.
- Ortíz Pérez, A. (2014). Technology for the integrated management of processes in universities. Application at the University of Holguín. (Thesis presented in option to the scientific degree of Doctor of Technical sciences) University of Holguín Oscar Lucero Moya, Holguín, Cuba.
- Communist Party of Cuba. (2011). Guidelines of the economic and social policy of the Party and the Revolution. Havana: Political Editor.
- Pérez Campaña, M. (2005). Contribution to management control in the supply chain. Model and procedure in distribution organizations. (Thesis presented as an option to the scientific degree of Doctor of Technical Sciences). Central University of Santa Clara Martha Abreu, Villa Clara, Cuba.
- Reyes Seijas, L.M. (2015) Update of the Management Control System of the University of Holguín. (Thesis presented in option to the title of Industrial Engineer), Holguín University Oscar Lucero Moya, Holguín, Cuba.
- Tristá Pérez, B. (2007). Theoretical-methodological contributions and practical applications for the development of University Management as a field of studies. University of Havana, Havana, Cuba.
- Vásquez Aguilar, J., and Carrillo Landazábal, M. (2012). General procedure for the quality control system in universities through process management. Paper presented at the VIII International Congress of Higher Education University 2012. Havana, Cuba.

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